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PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION.

No. 28,506, A.D. 1932.

Improvements in and relating to Wall Plugs and similar Fastening Devices.

We, CECIL ROBERTS NORMAN, of "Teviotdale", Burgess Hill, Sussex, and FRANCIS HENRY HARRISON, of "Eskdale", Silverdale Road, Burgess

5 Hill, Sussex, both British Subjects, do hereby declare the nature of this invention to be as follows:

This invention relates to wall plugs and similar fastening devices whereby 10 articles may be hung upon walls or from the ceiling or supported on the floor or other foundation or for any other purpose such as holding the parts of a casing or the like together to thereby securely 15 hold them closed.

The invention has particular reference to wall plugs or the like in which a sleeve member is provided which is first inserted into a prepared opening or socket, the usual holding screw then being forced 20 into the sleeve.

One of the drawbacks associated with such a system of wall plug construction is that the sleeve has a tendency to commence 25 rotating when the usual holding screw is being secured in position and thus renders the whole attachment liable to be disturbed or to come adrift.

There is also the further drawback that 30 the holding screw cannot be removed, say, more than once or twice since if removed at frequent intervals and screwed in again the device becomes inoperative as the screw will no longer hold.

35 One object of the present invention is to enable the sleeve to be rigidly fixed in position so that the screw may be inserted and withdrawn as many times as is necessary without in any way interfering with the security of the arrangement.

Another object of the invention is to prevent all tendency on the part of the sleeve to rotate whilst the usual holding screw is being manipulated.

45 A further object of the invention is to provide a fixing member for the reception of a holding screw whereby any tendency for the member to rotate may be

positively controlled until such time as the fixing member commences to become 50 operative.

The invention consists in a wall plug or other holding or security device comprising a non-rotatable sleeve and a holding screw within and having threaded engagement with the sleeve so that when the screw can no longer pass through the sleeve a differential movement of the sleeve relatively to the screw is caused to thereby de-form or expand the screw so as to cause parts of the sleeve to project therefrom to constitute a holdfast.

The invention also consists in a wall plug or other holding or security device comprising a sleeve fitted into a prepared opening and held stationary therein and means whereby when the usual holding screw is manipulated to secure the arrangement in position the plug is so deformed circumferentially that a part or parts thereof is or are laterally projected to form a holdfast for the sleeve.

The invention further consists in a wall plug or other holding or security device comprising a sleeve adapted to be held stationary and to have screw-threaded engagement with the usual holding screw in such a way that when the screw has completed its inward movement, continued operation thereof will cause the sleeve to move relatively to the screw and become de-formed so that one or more ribs, points, harb or the like are laterally projected therefrom to engage with the hole previously prepared to receive the sleeve and thus constitute a holdfast.

The invention still further consists in means whereby the form of an expanded part or parts may be controlled.

In carrying the invention into effect according to one embodiment a tubular sleeve member, preferably of soft metal, has screw threads formed therein by means of indentations, slits, projections, or in any other suitable way, and such threads may be continuous around the

circumference of the sleeve or interrupted. The threads may be of any suitable pitch according to the nature of the screw or bolt to be used therewith.

5 The sleeve is slitted or otherwise weakened longitudinally in predetermined positions around the circumference in order that the material of the sleeve may swell or expand outwards at 10 that point when the sleeve is compressed along its length. The sleeve may be provided with any suitable number of such weakened areas and these parts may be arranged at any suitable position on 15 the sleeve so that the expansion or deformation may take place at any predetermined point, and the weakened areas may be so arranged that the form of any expansion may be controlled.

20 Although one group of slittings only may be used, it is to be understood that any number of such groups may be used along the length of the sleeve so that expansions may take place at any number 25 of points as is desired.

The sleeve is preferably also weakened in any suitable way at or adjacent to the forward end of the slits so that upon pressure being applied to the sleeve 30 along its length as would happen upon inserting and rotating a screw when in use, the sleeve foreshortens and causes one or more talons, projections, ribs, barbs or the like to project laterally and 35 press into the sides of the previously formed socket in the wall and act as positive anchors against withdrawal. This action may be assisted by previously cutting races, or recesses, in the sides of the 40 hole formed for the sleeve, by means of a suitable tool, having for example a number of expanding or expandable cutters.

45 A projection or lug is left upon the forward end of the sleeve to afford a hand grip to prevent rotation when the screw is first inserted. Upon expansion of the sleeve, however, in a suitably sized hole, it grips the sides of the hole sufficiently 50 to, of itself, prevent rotation and the projection or lug may be subsequently broken off, which is facilitated by heavily scoring it close to the sleeve. By this means any rotation of the sleeve in the 55 hole, tending to enlarge it, or preventing the screw or bolt entering the threads, is effectively overcome. The lug may alternatively be a separate member attached to sleeve in any convenient way.

60 The sleeve may also be scored at the end of the slits or otherwise to assist in the expansion.

In a modification to be used with bolts and nuts the bolt is inserted with its 65 head downwards in a suitably sized hole

holding screw, and the sleeve is slipped into the hole over the bolt, engaging the head thereof. A nut is threaded on the bolt and engages the upper end of sleeve and upon advancing the nut along the bolt the sleeve is foreshortened as previously described thus forming by expansion claws which grip and bind in the walls of the hole and prevent withdrawal. Firm attachment may now be made in 70 the usual way to the projecting end of the bolt. In hard materials, such as concrete, brick, and the like, the claws may be assisted in their grip by previously cutting races of a suitable form in the walls of the hole. The claws expand into said races and effectively prevent withdrawal.

For cutting said races any suitable tool or cutter may be used.

In an alternative construction one end of the sleeve is compressed to form a tip having a hole of smaller internal diameter and around which wings project. The sleeve is weakened or slitted and although the walls thereof may remain parallel, or straight, they are preferably corrugated in concentric or spiral form. In use, the sleeve is pressed into a suitably sized hole 90 the wings gripping the sides thereof to prevent rotation. A screw inserted in the sleeve and rotated in the usual way forms for itself a thread in the reduced tip, and advances down the sleeve. Upon the head of the screw, or the article being 95 fixed, meeting the end of the sleeve, further rotation of the screw causes the sleeve to foreshorten and expand. The sleeve may contain a previously formed thread, and may alternatively be a separate member and may be an ordinary standard nut.

The sleeve may be divided into separate members, each member preferably fitting another by means of male and female cones as shewn, and slitted to 100 allow of easy expansion when the members are compressed together upon a screw when in use.

Any number of said members may be used according to length of screw and the 115 scored portions may face either way or any way relative to each other to vary the form of expansion or the said members may be made as shallow coned washers fitting into one another or one 120 being shewn in opposition to one another.

It is to be understood that any of these constructions may be formed from any suitable material such as metal, fibre, papier mache, etc. and different material 125 may be used according to the strength required and the nature of the medium in which they are to be used. Also the cross section may be of any suitable shape, such as round, square, hexagonal, etc. 130

star-shaped etc.

Further, additional sleeves may be used, one slipped over another, so that expansion of the inner causes expansion of the outer and such inner and outer sleeves may be of different materials for example the inner sleeve metal and the outer sleeve rubber. Such outer sleeves may likewise be perforated or slit and arranged so that their expansion is added to that of the inner sleeves, allowing a firm grip to the obtained in an enlarged hole.

In any of the aforementioned constructions the surfaces engaging with the walls of the containing hole may be serrated or

otherwise roughened to assist in preventing rotation.

The sleeve may contain a liquid or plastic filling, for example, liquid cement or any convenient substance or compound of like nature, which upon insertion of the screw is forced through the orifices of the sleeve into intimate contact with the sides of the hole in which the sleeve is fitted thus upon setting hard firmly cementing the sleeve in position.

The invention may be applied to fastenings for crates and packing cases.

Dated this 12th day of October, 1932.

MARKS & CLERK.

#### PROVISIONAL SPECIFICATION.

No. 3411, A.D. 1933.

#### Improvements in and relating to Wall Plugs and similar Fastening Devices.

30 We, CECIL ROBERTS NORMAN, of "Teviotdale", Burgess Hill, in the County of Sussex, and FRANCIS HENRY HARRISON, of "Eskdale", Silverdale Road, Burgess Hill, in the County of Sussex, both British Subjects, do hereby declare the nature of this invention to be as follows:—

This invention relates to wall plugs and similar fastening devices whereby articles may be hung upon walls or from the ceiling or supported on a floor or other foundation or for any other purpose such as holding the parts of a casing or the like together to thereby securely hold them closed.

45 The object of the present invention is an improvement in or a modification of a device of this kind as described in the specification of co-pending application No. 28,506 of 1932.

50 The invention consists in manufacturing such a device by a flat stamping having two parts joined together by a bridge-like member or members adapted to engage the point and/or the shank of the screw to be held, the stamping being subsequently bent into a longitudinal semi-circular form, the two half shells being then brought edge to edge.

55 The invention also consists in supplementing the above formed sleeve with serrations at one end by which the hand grip for the tube is secured in position, and in forming the other end of the sleeve with helical grooving or indentations adapted to receive a helical gripping spring, such grooving being adapted to engage the thread of the holding screw within the sleeve.

In carrying the invention into effect according to one embodiment, a flat blank is stamped out to form the sleeve, and the blank comprises two elongated parts joined end to end with a connecting piece or pieces. Each elongated part will serve afterwards as a longitudinal half portion of the sleeve, and one end of each portion is made with a number of serrations or short longitudinal ribs, and the other end is formed with or indented so as to provide a series of curves or part helices. The remainder of each portion is formed with slots, slits or similar devices to provide weakened areas.

60 After the blank has been thus treated, the two elongated portions are bent longitudinally to a semi-circle. The two semi-circular parts are now bent upwards through 90° so that their edges come together and if desired may key together and constitute a tube across one or both ends of which is a bridge piece or web. To secure such an assembly, there is fitted on to the serrations at one end the hand gripping lever by which the sleeve is held in situ while the centre holding screw is being driven in; the other end of the sleeve (as well as the top) is gripped by means of a spring, the convolutions of which engage the helical indentations formed in the sleeve. With the assembly thus completed, it may be dipped in molten tin or other liquid and subjected to centrifugal action to remove the excess metal.

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The action of such an appliance in operation will be the same as described in the prior application before referred to. The threads of the central holding screw 5 will engage the helical indentations on the interior of the sleeve and the point of the screw will engage a hole or holes left in the bridge or bridges connecting the two halves. When the screw can no 10 longer progress forward, the further turning of the screw will cause deformation of the weakened parts of the sleeve, causing expansion outwards to make the

desired holding grip for the appliance.

The gripping lever in a modification 15 may be provided with a talon or claw which may be driven into the wall so that the lever need not be held whilst the appliance is being adjusted. The lever and claw may be subsequently removed. 20

Such a construction of the described 25 appliance is very simple but effective and non-expensive in working costs.

Dated this 3rd day of February, 1933.  
MARKS & CLERK.

#### COMPLETE SPECIFICATION.

#### Improvements in and relating to Wall Plugs and similar Fastening Devices.

We, CECIL ROBERTS NORMAN, of 30 "Teviotdale", Burgess Hill, in the County of Sussex, and FRANCIS HENRY HARRISON, of "Eskdale", Silverdale Road, Burgess Hill, in the County of Sussex, and both British Subjects, do 35 hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

40 This invention relates to wall plugs and similar fastening devices whereby articles may be hung upon walls or from the ceiling or supported on the floor or other foundation or for any other purpose 45 such as holding the parts of a casing or the like together to thereby securely hold them closed.

The invention relates more particularly to wall plugs or sockets of the kind comprising 50 a non-rotatable sleeve member that has threaded engagement at its inner end with a holding screw, the end of which passes therethrough to foreshorten the sleeve at a weakened portion so as 55 to cause one or more of the weakened portions to grip the walls of the hole and constitute a holdfast.

Wall plugs have been proposed which comprise a split tube formed from a sheet 60 blank with longitudinal slots extending nearly the length of the blank a projection on the blank at the lower end being turned up so that a thread is cut in a hole therein when a screw engages same 65 to distort the slotted portion to grip the walls of the support.

One object of the present invention is to enable the sleeve to be rigidly fixed in position so that the screw may be inserted 70 and withdrawn as many times as is necessary without in any way interfering with the security of the arrangement.

The invention consists in a wall plug

or socket of the kind first referred to in which the sleeve consists in a non-split 75 tube slotted towards the outer end to form the weakened portion.

The invention also consists in a modification of the wall plug according to the previous paragraph in which the sleeve 80 consists in a tube which is split longitudinally and formed in one piece from a sheet blank, the outer portion having cross slits that form half round bars which are curved in opposite directions.

The invention also consists in the further features as hereinafter claimed and described.

The invention will now be described by way of examples to the accompanying 90 drawings, in which:—

Figure 1 is a side elevation of a device according to the invention, inserted in a socket,

Figure 2 is a similar view but showing 95 the device as secured in position,

Figure 3 is a top plan view of Figure 1,

Figure 4 is a horizontal section taken on the line 4—4 of Figure 2,

Figure 5 is an elevation of another 100 form of device,

Figure 6 is a transverse section taken on the line 8—8 of Figure 5,

Figure 7 is a side elevation of another 105 form of sleeve prepared from a sheet metal stamping,

Figure 8 is a developed view of the stamped out blank,

Figures 9 and 10 show an elevation and 110 a plan view respectively of a detail,

Figures 11 to 18 show another form of sleeve in four stages of manufacture; Figures 11, 13, 15, and 17 showing elevational views and Figures 12, 14, 16, 18 being corresponding end views at each stage. 115

Figure 19 is an elevation of a still further form of sleeve.

Figure 20 is a corresponding end view.

Figures 21 to 25 show a modified form of the device made from a stamping, and Figures 26 to 36 show various forms of stampings.

In carrying the invention into effect and referring to Figures 1 to 4, a tubular sleeve member 40, preferably of soft metal, has formed thereon at one end, screw threads 41 by means of indentations, slits, projections, or in any other suitable way, and such threads may be continuous around the circumference of the sleeve or interrupted, the latter form being that illustrated in Figure 1. The threads may be of any suitable pitch according to the nature of the screw or bolt to be used therewith. The sleeve 40 is slotted or otherwise weakened longitudinally in predetermined positions as at 42, the cuts being spaced around the circumference of the sleeve in order that the material thereof may swell or expand outwards at such positions when the sleeve is compressed longitudinally. The sleeve 25 may be provided with one or any suitable number of such weakened areas 42 and these parts may be arranged at any suitable position on the sleeve so that the expansion or deformation may take place 30 at any predetermined point, and further the weakened areas may be so arranged that the form of the expansion may be controlled, for example the slits 42 are shown as extending over a part 43 of the 35 tube which is of full diameter, and also over a part 44 which is of a reduced diameter. The thickness of the tube 40 at the part 44 is less than that at 43 so that these parts are of different strength 40 for a purpose hereinafter described.

The sleeve 40 made in this way is placed in a socket which has been previously bored or formed in the wall 45 or other backing. To now lock the sleeve 45 in position a screw 46 (which may be a wood screw) is then passed into the tube and threaded through the slits or projections 41, the sleeve in the meantime being held from rotating by an ear or lug 47 formed on the external end of the sleeve.

When the continued inward movement of the screw ceases, the continued rotation of the screw induces an endwise pressure upon the sleeve having a tendency to move 55 the sleeve backward along the screw. This however, being prevented by the screw head, the weakened areas 43—44 give way as the sleeve foreshortens and the material between the slits 42 expands 60 outwards to form barbs, talons or projections 48 (Figure 2) which entirely lock the sleeve in position by being pressed against or into the wall of the surrounding socket.

It is to be noted that the form of these

expanded projections is governed by the two differently weakened portions 43 and 44. Owing to the weaker part 44, when the sleeve is deformed, the part 44 is deformed more than the part 43 and by this construction the projections 48 assume the barb form indicated in Figure 2.

It is to be understood that the areas on the sleeve may be weakened at any one or more places and this will consequently affect the form which the sleeve assumes when it is subjected to longitudinal compression.

The sleeve has now been definitely secured in position in the socket provided and the ear 47 may now be removed, for instance by breaking it along a scored line shown at 49 in Figure 3. The screw 46 is now removed from the sleeve and the particular article or member 50 which it is desired to secure may now be placed in position as seen in Figure 2, after which the screw 46 may be reinserted into the sleeve and finally secure the member in position. Thus, it will be understood that the screw 46 may be removed and replaced as many times as desired, but it will not interfere with the condition or position of the sleeve since this always remains in position in the wall or other supporting backing and is quite unaffected by the removal of the screw.

It has been explained above that by the longitudinal compression of the sleeve portions thereof are laterally expanded 100 so as to be forced into the surrounding socket in the wall.

In an alternative construction shown in Figures 5 and 6, one end of the sleeve 40 is compressed as at 58 to form a tip having a hole 59 of smaller internal diameter than the remainder of the sleeve and the exterior of such reduced end is fitted with wings or distance pieces 60 which engage with the side wall of the socket 55.

As shown, the sleeve 40 has three sets of slits or slots formed thereon indicated at 61 whilst the free end of the sleeve is formed with the lug or ear 47 previously described.

It will be understood that by inserting a suitable screw through such a sleeve, its free end will engage the screw threaded hole 59 at the inner end and when the screw can no longer pass onwards through the sleeve, then by continued operation of the screw, the sleeve will commence to foreshorten, causing the sleeve at the parts where the slots 61 are formed to expand and grip against the socket wall 55. Figure 5 represents this expanded condition of the sleeve.

The slots 61 are shown in three co-axial rings, but it is to be understood that such slots may be formed by forming the slits 130

along a spiral line which would produce the same effect.

The small hole 59 at the inner end of the sleeve may either be screw threaded 5 to receive the threads of the holding screw or the holding screw may form its own threads in the hole 59 as it is screwed home.

It is also to be noted that the inner 10 end of the sleeve in Figure 5 need not necessarily be formed integrally with the sleeve; it may in fact be used as a separate member so as to constitute as it were a nut into which the holding screw 15 threads itself.

Moreover, the construction of the sleeve is not necessarily limited to being made with three sets of slots. Where desired, it may be formed with one set only.

20 Referring now to the modification shown in Figures 7 and 8, a method is illustrated for forming a sleeve from a sheet metal stamping, according to which there is stamped out a flat blank comprising 25 two elongated portions 73 which are joined end to end with a connecting piece 74 and a hole 75 is provided in such connecting piece. Each elongated part will serve as a longitudinal half portion of 30 the completed sleeve shown in Figure 7, and the outer end of each portion 73 is formed with a number of serrations or short longitudinal ribs 76, whilst the two inner adjacent ends have impressed there- 35 in a series of curves or part helices 77. The body portion of each part 73 is formed with a number of slots, slits or similar devices 78 to provide weakened areas.

After the blank has thus been treated 40 the two elongated portions 73 are bent longitudinally to form a semi-circle. The two semi-circular parts are now bent upwards through  $180^\circ$  so that their longitudinal edges come together and if desired may key together so that a tube or sleeve is thus constituted as shown in Figure 7.

As described, there is arranged across 50 one end of such tube the bridge piece or web 74. Such a bridge piece may be supplemented by another bridge piece arranged at or towards the upper end which would be provided with a hole similar to that indicated at 76.

To secure such an assembly, there is 55 fitted on to the serrations 76 at one end the ear or lug 47 by which the sleeve as has been before described is held in situ and prevented from rotating while the 60 centre holding screw is being driven in. The other end of the sleeve (as well as the top end if desired) is gripped by means of a spring 79 which is made to engage with the helices 77 which were 65 previously formed on both halves.

With the assembly thus completed it may be dipped in molten tin or other molten metal and subjected to centrifugal action to remove the excess metal. The action of this modification in operation 70 will be similar to that described above.

The threads of the central holding screw (not shown) will engage the helical indentations 77 of the interior of the sleeve and the point and/or the shank 75 of the screw will engage the hole or holes 75 left in the bridge or bridges 74 connecting the two halves of the appliance. When the holding screw can no longer progress forward, the further turning 80 thereof will cause deformation of the weakened parts of the sleeve, causing the necessary expansion outwards to obtain the desired anchoring action.

In all of the various forms above described, the ear or lug 47 has been provided so that the tube or sleeve may be held stationary when the holding screw is being actuated.

To avoid the necessity of such a manual holding of this lug it may be provided with means by which it can be held mechanically. As shown in Figures 9 and 10, the lug at its free end or adjacent 90 its free end is formed with a talon or tongue 80 which may be formed by stamping and when the sleeve is inserted into its socket, the talon may be forced into the supporting surface so as to hold the lug stationary.

In a modification, means may be provided whereby the lug may be loosely attached to the end of the sleeve so that it may be applied and removed when necessary.

To enable this to be effected, the end of the sleeve may be fitted with a number of small teeth which engage with corresponding slots in the lug, whereby the two parts may be temporarily connected 105 together.

Referring to Figures 11 to 18, another method is illustrated for manufacturing the sleeve 40. The first stage illustrated by Figures 11 and 12 comprises the cutting off of a suitable length of thin walled metal tube 81 and this is then expanded for approximately half its length by any suitable expanding tool so as illustrated in Figures 13 and 14, the 115 tube 81 is enlarged as at 82 for approximately half its length.

The next stage shown in Figures 15 and 16 comprises the cutting of a number of slits or slots 83 in the enlarged part 82 125 and it will be understood that the operation of expanding in Figure 13 may be formed by placing the tube upon a suitable mandrel. Without removing it from the mandrel, the slits 83 may be 130

formed, after which the device may be completed by crimping the end of the expanded part 82, the crimps being formed by a number of grooves pressed 5 into the tube as shown at 84 in Figure 18.

Suitable threads are now impressed upon the interior of the crimped end of the sleeve, so as to receive or engage with the holding screw as described.

10 The unexpanded end of the tube is then treated so as to form thereon the ear or lug 47 and it is to be noted that in Figure 17 the endwise compression of the tube has been effected so that the desired 15 expansion has been produced.

Such a method of manufacture is extremely simple and may be effected at comparatively moderate working expense and forms a practicable device.

20 Figures 19 and 20 show a final form of the holding sleeve 40 in which the threads 41 are shown as fully impressed around the sleeve and the internal diameter is reduced as compared with the 25 remainder of the sleeve after the manner shown in Figures 5 and 6.

In a further modification shown in Figures 21 to 26, the sleeve is formed in one piece from sheet metal 90. The blank 30 is preferably of elongated shape with a width of about one and a half circumferences of the particular size of sleeve required. The several stages in the manufacture of the sleeve can be followed 35 from the Figures.

At one end or more lugs 91 or the equivalent are stamped out to form projections by which the sleeve is locked in position when making use of the device.

40 Towards this end is pressed out a number of lateral or cross slits, the bars 92 thus formed being subsequently forced into semi-circular shape in opposite directions (see Figures 23 and 24) thus constituting 45 a tube with apertured walls. Towards the opposite end of the stamping there is also pressed out, a number of inclined lateral depressions or raised portions 93 shaped so as to engage the thread or threads of a screw when the sleeve is fitted in position. The central portion of the blank 50 is also stamped, shaped, pressed or thinned to form a weakened part 94, a hole 95 being cut out near the middle in order that when the material is bent into its longitudinal circular form ready for use, a clear space is left in order that one of the weakened portions is not covered up by the returned or folded back part 55 96 as seen in Figure 26. The weakened portion 94 is preferably given a slight bias so that when the screw is screwed in from one end and foreshortening takes place, the weakened part bends outwardly 60 and thereby grips the sides of the hole 65

in the wall or backing. The ear or lugs 91 prevent rotation of the sleeve in the manner already stated and these lugs or projections instead of being formed integrally from the blank may be attached to 70 the sleeve in any convenient manner.

Figures 27 to 31 show examples of 75 pressed blanks with various forms of weakened parts 97, the lateral sides of which are cut away to enable the gripping parts to be pressed outwardly, and Figures 32 to 36 show other examples in which the weakened parts 98 by cutting away the middle portions as shown at 95 in Figure 22.

From the foregoing description, it will be understood that a simple and easily constructed wall plug device is obtained, whereby a security fastening is provided, which once it is anchored in the wall or 80 other supporting surface, will not work loose and in which the holding screw may be removed and replaced as many times as is necessary without interfering with the security of the hold.

When and if desired, the sleeve may 85 contain a liquid or plastic filling, for example, liquid cement or any convenient substance or compound of like nature which on insertion of the screw is forced through the orifices of the sleeve into intimate contact with the sides of the hole into which the sleeve is fitted, so that when such a filling has set hard, the sleeve will be firmly cemented in position. 100

It is also to be noted that those parts or surfaces of the sleeve which are forced into the socket walls may be serrated or otherwise roughened to assist in preventing rotation and finally, the sleeve may 105 be either cylindrical, square, hexagonal or of other desired shape in cross section.

Whilst in any of the foregoing constructions, the sleeve and the parts associated therewith will be usually made of 110 soft metal, such sleeve may, however, be made of any other suitable material such as fibre, papier mache, or the sleeve made in any of these materials, even metal, may be coated with rubber. 115

Moreover, different material may be used according to the strength required, and the nature of the medium in which the devices are to be used.

Moreover, the sleeves may be duplicated, that is to say, one may be slipped over another so that expansion of the inner, causes expansion of the outer, and such inner and outer sleeves may be made of different materials for example, the 120 inner sleeve of metal, the outer sleeve of rubber. Such outer sleeves may likewise be perforated or slit and arranged so that their expansion is added to that of the inner sleeves, allowing a firm grip 125 130

to be obtained in an enlarged hole. A fastening or security device according to the invention may also be adapted for fastenings for crates and packing cases.

5 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

10 1. A wall plug or socket of the kind first referred to in which the sleeve consists in a non-split tube slotted towards the outer end to form the weakened portion.

2. A modification of the wall plug or socket according to Claim 1, in which the sleeve consists in a tube which is split longitudinally and formed in one piece from a sheet blank, the outer portion having cross slits that form half round bars 20 which are curved in opposite directions.

3. A wall plug or socket as claimed in Claims 1 or 2, in which the deformable portion or portions of the sleeve is or are differently weakened so that the parts may 25 be controlled.

4. A wall plug or socket as claimed in Claims 1 to 3, in which the outer end of the sleeve is integrally or detachably formed with an ear or lug by which the 30 sleeve is prevented from rotating when the holding screw is being manipulated therewithin.

5. A wall plug as claimed in Claim 4, in which the ear or lug is fitted with 35 a projecting talon, whereby when driven into the backing will hold the ear or lug.

6. A wall plug or socket as claimed in Claim 4, in which the ear or lug is made with a scored or weakened part, so that 40 when the device is secured in position, the ear or lug may be readily removed.

7. A wall plug or socket as claimed in Claim 1, in which the inner end of the sleeve is of smaller diameter than the 45 remainder of the sleeve, so that the holding screw will cut threads therein as it is impelled inwards.

8. A wall plug or socket as claimed in Claim 7 in which the inner end of the 50 sleeve, which is of smaller diameter than the remainder of the tube, is fitted externally with one or more ribs or vanes to fit the internal diameter of the socket.

9. A wall plug as claimed in Claims 1 55 to 3 in which the sleeve is supplemented by an auxiliary cap or caps which are adapted preferably to screw thereon, and are formed with weakened parts so that when the sleeve is shortened, the auxiliary cap or caps are caused to thereby expand.

10. A wall plug as claimed in Claim

2 formed of two elongated portions connected by one or more bridges, the two portions being then formed into a semi-circular shape and afterwards brought together, so that the two halves complete a single sleeve for the purpose described. 65

11. A wall plug as claimed in Claim 9 in which the halves forming the sleeve are made with weakened portions, and one end with a series of serrations or equivalent means, and at the other end, formed with a series of indented part helices, whereby when the halves are 70 brought together to form the sleeve, an ear or lug may be applied upon the serrations at one end and a helical spring applied at the other end to assist in holding the parts together, thereby constituting a sleeve which will expand inside a socket when a central holding screw is actuated to endwise compress the sleeve. 75

12. A wall plug as claimed in Claim 2 in which the sleeve is made in one piece from sheet metal of elongated shape one or more lugs being formed at one end, towards this end are provided lateral slits forming bars which are subsequently forced into semi-circular shape in alternately opposite directions, the opposite end of the stamping having impressed thereon inclined lateral depressions adapted to engage the threads of the holding screw, while the central portion 80 is cut out or thinned and/or provided with slits to constitute the weakened portion, the prepared blank then being folded in the manner substantially as described. 85

13. A method of manufacturing a wall plug as claimed in Claim 1, in which a tube is placed upon a mandrel and expanded in diameter for a part of its length, then provided with a number of lengthwise slits or slots in such bulged 90 portion, then having the end of the bulged portion crimped and subsequently impressed with a series of part screw threads, the opposite end of the tube being formed with a projecting ear or lug for the purpose described. 95

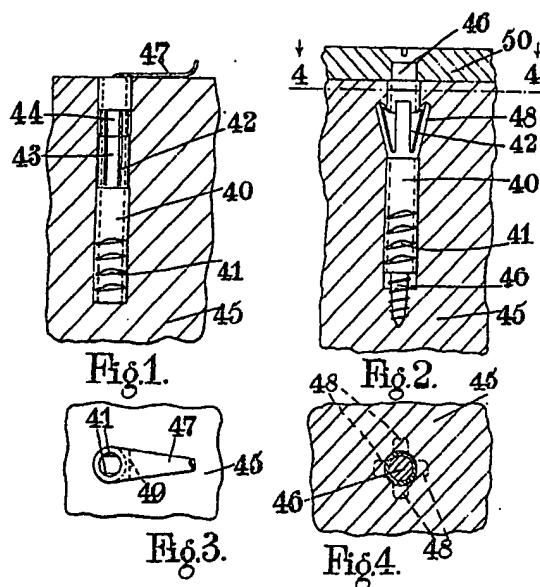
14. A wall plug as claimed in any of the preceding claims in which there is combined with the sleeve a plastic filling of cement or the like, such that when the 100 sleeve is secured in position, the cement or other plastic material will completely seal and lock the sleeve in position. 115

15. Improved wall plugs constructed from tubes and sheet blanks as described 120 and shown in the accompanying drawings.

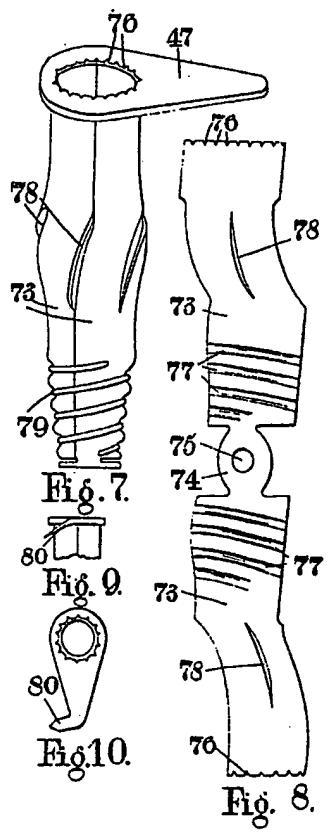
Dated this 7th day of July, 1933.  
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## 408,668 COMPLETE SPECIFICATION

SHEET 1.



SHEET 3



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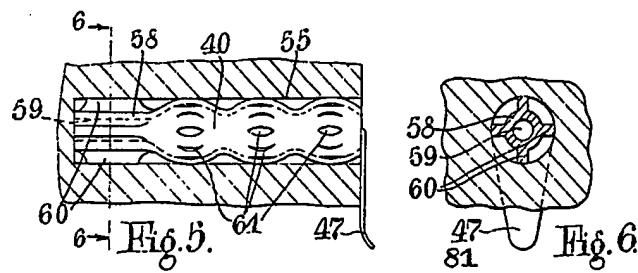


Fig. 12

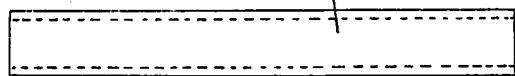


Fig. 11.



Fig. 14.



Fig. 16.

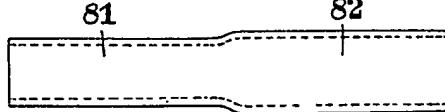


Fig. 13.

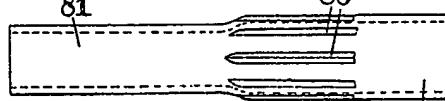


Fig. 15.

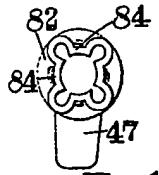


Fig. 18.

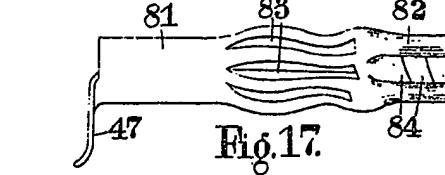


Fig. 17.



Fig. 20.

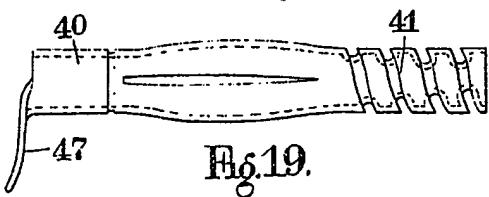


Fig. 19.



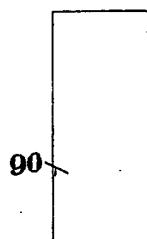


Fig.21.

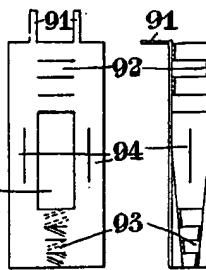


Fig.22. Fig.23.

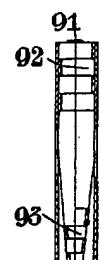


Fig.24.

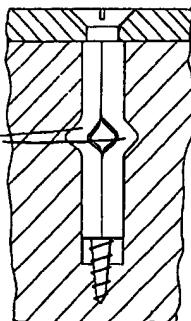
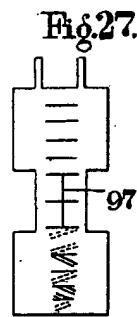
Fig.25.  
Fig.26.

Fig.27.

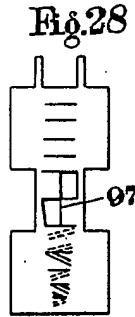


Fig.28

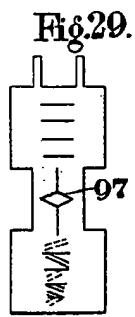


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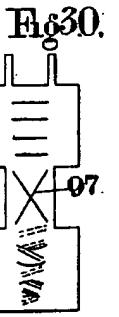


Fig.30.

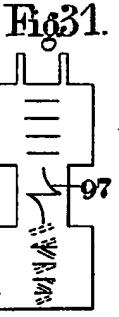


Fig.31.

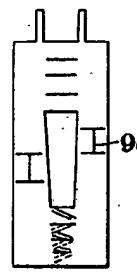


Fig.32.

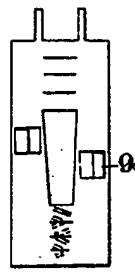


Fig.33.

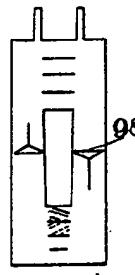


Fig.34.



Fig.35.

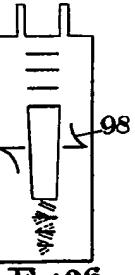


Fig.36.

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